7414

INSTALLATION ENGINEERING DATA

Date form completed 4/26/66

(See Remarks at end of form)

Tentative [X] Valid until _____

Final data [ ]

I. INSTRUMENT

STATINTL

A. Name of instrument: Chip Format Printer

B. Manufacturer: [redacted] ?

STATINTL C. Contract number: [redacted]

D. Delivery date: Tentative: January 1967 Final: _____

II. PHYSICAL FEATURES

A. Sub-assemblies:

1. Number of sub-assemblies: ~~150~~ 150 ~~deleted~~

2. Largest sub-assembly: Weight 2,000 lbs; 50 " H x 60 " W x 36 " D

3. Heaviest sub-assembly: Weight 2,000 lbs; 50 " H x 60 " W x 36 " D

B. Assembled instrument:

1. Number of major components: ~~150~~ 3

2. Largest component: Weight 400 lbs; 38 " H x 60 " W x 36 " D

3. Heaviest component: Weight 400 lbs; 38 " H x 60 " W x 36 " D

4. Total floor space required after assembly, including maintenance access space. 8 Ft. ___ In. High x 15 Ft. ___ In. Wide x 15 Ft. - In. Deep.

5. Total weight of assembled instrument: 3500 lbs.

C. Type of base of mount: Flat ___; 3-point air suspension ___; 4-point suspension ___ Teletypewriter Printer Console Electronic Console

D. Does the instrument have built-in mobility? Yes ___ No X

E. Is the instrument particularly sensitive to vibration? Yes X No ___ — shock Mounted (Air)
Will the instrument generate vibration? Yes ___ No X

F. Are any special or unusual tools or fixtures necessary or adviseable for the installation of the maintenance of this instrument? Yes X No ___.
If "Yes," please describe: Will be supplied at later date.

III. UTILITIES

A. Electrical:

		AC	DC
1.	Voltage	208 Volts / 115 Volts	NA Volts / NA
2.	Current	10.8 Amps/phase est. Max.	NA Amps
3.	Frequency	60 cps	
4.	Nr. of phases	3 Ph	
5.	Nr. of wires	4	
6.	Power required	3K Watts Max.	- - Watts
7.	Power factor	.80 (~~Leading~~) (Lagging) estimated	

8. Type of outlet: Two prong ___; three prong ___; Twist lock X; Perm. ___

9. Type of ground: Building conduit X; Direct earth ground ___.

10. Should the instrument be shielded, either from external electromagnetic signals or to prevent interference with other equipment? Yes ___ No X
If "Yes," to what extent? _____

- Toxic liquid gate 3-4 vent

B. Air conditioning:
1. Desired environment: Room air temperature of 65 °F / 75 °F and relative humidity of 30% / 60 %.
2. Input Air: Is a direct connection necessary? Yes ____ No X ; Adviseable? Yes ____ No X ; If "Yes," what is the connector type and size? ________ Recommended input air temperture ___ °F / ___ °F. Relative humidity ___% / ___%. If input air must be filtered, what is the maximum particle size in microns? ____ What particle count? ________/ cu. ft.
3. Output Air: Is a direct connection to the return air duct necessary? Yes X No ____. Adviseable? Yes X No ____. Connector type and size? 4" ______. Output air temperature 80 °F / 120 °F. Relative humidity 30 % / 80 %. Output heat ___ BTU/Hr. Flow of ___ CFM. Is output air toxic? Yes X No ____; Noxious? Yes X No ____.

C. Plumbing:
1. Is water required? Yes ____ No X ; Pressure ____ PSIG, flow ___ GPM.
2. Type of water required:
   Tap ___ °F / ___ °F — Deionized ___ °F / ___ °F
   Tempered ___ °F / ___ °F — Filtered ___ °F / ___ °F
   If filtered, give maximum permissible particle size in microns and the maximum permissible count. _____ microns _______ particles/cu. ft.
3. Pipe required:
   Galvanized ____ — Copper ____ — Size ______
   Stainless Steel ____ — Plastic ____ — Type of connector ______
4. Floor drain:
   Diameter of drain ____ — Galvanized drain? ____
   Plastic drain? ____ — Glass drain? ____
5. Are any chemical solutions used in the device? Yes X No ____. If "Yes," state the nature of the solution(s), permissible temperature range, flow rate in appropriate units and the filtration necessary for each solution Feron 112 and Toluene (internal).
6. Size of pipes and connectors Internally supplied.

D. Compressed air: generated internally
Is compressed air required? Yes ____ No X . Water free? ____ Oil Free? ____
Type and size of connector? _____. Pressure _____ PSIG. Flow in CFM Maximum ____, minimum ____, average ____.

E. Vacuum: generated internally
Is vacuum required? Yes ____ No ____. Pressure ____ PSIA or (inches of water) (millimeters of mercure). Displacement in CFM, maximum ______, minimum _____, average _____. Type and Size of connectors __________.

Self contained vacuum

F. Peripheral Devices:
Will the instrument be connected to any peripheral devices such as a computer or data input or data output device? Yes X No ____. If "Yes," give, in detail, the nature of the connection to the peripheral device such as coaxial cable, multiple wire connector, etc. To external teletypewriter.
ASR 35 ~~and~~ punch + teletypewriter.

IV. REMARKS
A. Use additional sheets if more space is required for environmental conditions or utilities not mentioned above.
B. Submit three typed copies of the completed form to the Technical Representative.

C. Attach three copies of a dimensioned outline drawing of each major component and of the completed assembly. Include the estimated weight of each major component and of the completed assembly. Indicate, on the outline drawing of the completed assembly, the space required for access to the instrument for maintenance.

D. If a question does not apply to the instrument, insert "N/A" (Not Applicable) in the appropriate blank space.

STATINTL

[redacted]

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Next 5 Page(s) In Document Exempt

Standards

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8½" x 173"

American Standard Code for Information Interchange

Editor's Note

This presentation is adapted from the main and supporting documents prepared by ASA Subcommittee X3.2 on Coded Character Sets and Data Formats, as presented to the Miscellaneous Standards Board of ASA. Certain liberties were taken in the editing, particularly for consistency in the terminology used in the Appendixes, inasmuch as they are not a part of the standard. In addition, the figure which implicitly defines the code was redrawn for clarity, particularly with respect to the very important 4-bit subset.

The official document will become available from the American Standards Association, 10 East 40th St., New York 16, N. Y., for a nominal cost (<$1).—R.W.B.

Foreword

[*This Foreword is not a part of the American Standard Code for Information Interchange.*]

This American Standard presents the standard coded character set to be used for information interchange among information processing systems, communication systems and associated equipment.

Subsequent standards will prescribe the means of implementing this standard in the principal media, such as perforated tape, punched cards, and magnetic tape. Other standards will deal with collating and error control considerations. These standards will facilitate the interchange of digital information.

The 7-bit coded character set was developed by a group of highly qualified and experienced specialists in information processing and communication. Historical work in the field was reviewed, and a comprehensive program of original research and code design completed. Careful consideration has been given to the several conflicting code set requirements, and their resolution has been achieved in the standard code.

This standard was approved as an American Standard by the American Standards Association on 17 June 1963.

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the American Standards Association, Inc., 10 East 40th St., New York 16, N. Y.

1. Scope

This coded character set is to facilitate the general interchange of information among information processing systems, communication systems and associated equipment.

2. Standard Code

Example:

100 0001 = A

b_7 ..... b_1

	000	001	010	011	100	101	110	111
0000	NULL	DC_0 (1)	b	0	@	P	UNASSIGNED	
0001	SOM	DC_1	!	1	A	Q		
0010	EOA	DC_2	"	2	B	R		
0011	EOM	DC_3	#	3	C	S		
0100	EOT	DC_4 (STOP)	$	4	D	T		
0101	WRU	ERR	%	5	E	U		
0110	RU	SYNC	&	6	F	V		
0111	BELL	LEM	'	7	G	W		
1000	FE_0	S_0	(	8	H	X		
1001	HT/SK	S_1	)	9	I	Y		
1010	LF	S_2	*	:	J	Z		
1011	V_{TAB}	S_3	+	;	K	[		
1100	FF	S_4	,	<	L	\		ACK
1101	CR	S_5	-	=	M	]		(2)
1110	SO	S_6	.	>	N	↑		ESC
1111	SI	S_7	/	?	O	←		DEL

= 4 Bit Subset

FIG. 1. American Standard Code for Information Interchange

3. Positional Order and Notation

Standard 7-bit set code positional order and notation are shown below with b_7 the high-order, and b_1 the low-order bit position.

$$b_7\ b_6\ b_5\ b_4\ b_3\ b_2\ b_1$$

4. Legend

NULL	Null/Idle	DC_1-DC_3	Device control
SOM	Start of message	DC_4(Stop)	Device control (stop)
EOA	End of address	ERR	Error
EOM	End of message	SYNC	Synchronous idle
EOT	End of transmission	LEM	Logical end of media
WRU	"Who are you?"	S_0-S_7	Separator (information)
RU	"Are you ...?"	b	Word separator (space, normally nonprinting)
BELL	Audible signal	<	Less than
FE_0	Format effector	>	Greater than
HT	Horizontal tabulation	↑	Up arrow (Exponentiation)
SK	Skip (punched card)	←	Left arrow (Implies/Replaced by)
LF	Line feed	\	Reverse slant
V_{TAB}	Vertical tabulation	ACK	Acknowledge
FF	Form feed	②	Unassigned control
CR	Carriage return	ESC	Escape
SO	Shift out	DEL	Delete/Idle
SI	Shift in		
DC_0	Device control ① Reserved for Data Link Escape		

NOTE. Expanded definitions of some of the above terms may be found in Appendix D.

5. Qualifications

5.1 This Standard does not define the means by which the coded set is to be recorded in any physical medium. The standard code does not include any redundancy nor define techniques for error control. This standard does not specify a standard collating sequence. Further, this standard does not preclude the transfer of information coded in other forms where such requirements exist.

5.2 Deviations from this standard should be used only with full cognizance of the parties involved.

5.3 Unassigned codes are reserved for future standardization. Their use in information interchange prior to such standardization is a deviation from the standard.

5.4 This standard is presented with appendixes on, code design considerations and criteria, related subsets extensions and deviations.

APPENDIX A

Design Considerations for the Coded Character Set

A1. Introduction

A1.1 The standard coded character set is intended for the interchange of information among information processing and communication systems and associated equipment.

A1.2 Work will continue in the following areas (not necessarily listed in order of priority):

(1) Representation of the coded character set in the principal media (perforated tape, magnetic tape, and punched cards)
(2) Error control considerations
(3) Collating conventions
(4) Relation of the standard set to other sets
(5) Assignment of meaning to presently unassigned codes as required
(6) Relationship to other standards.

A2. Considerations Affecting the Standard

A2.1 There were many considerations which determined the standard's set size, set structure, character selection and character placement. Among these were (not listed in order of priority):

(1) Need for adequate number of graphics
(2) Need for adequate number of device controls and format effectors
(3) Desire for a non-ambiguous code; i.e., one in which every character has a unique meaning independent of other characters.
(4) Physical limitations of media and facilities
(5) Error control
(6) Special interpretation of the all-zeros and all-ones codes
(7) Ease in the identification of classes of characters
(8) Data manipulation requirements
(9) Collating conventions, both logical and/or historical
(10) Keyboard conventions, both logical and/or historical
(11) Other set sizes
(12) International considerations
(13) Programming languages
(14) Existing coded character sets.

A3. Set Size

A3.1 Considerable effort was devoted toward developing a 6-bit (64-character) set that would satisfy both communication and information processing requirements. The number of graphics used in information processing systems has been increasing; several systems today provide 64 graphics. When format effectors such as "carriage return," "line feed," "horizontal tab," etc. are added and additional allowance is made for device control codes, a 6-bit set is inadequate.

A3.2 An 8-bit set was considered but the need for more than 128 codes in general applications was not yet evident.

A3.3 A 7-bit set is the minimum size which will meet the requirements for graphics and control in applications involving general information interchange.

A4. Set Structure

A4.1 In discussing the set structure it is convenient to divide the set into eight columns of 16 characters each, as indicated in the standard.

A4.2 It was considered essential to have a dense 64-character subset which contained only graphics. For ease of identification this graphic subset was placed in four contiguous columns.

A4.3 Placement of the graphic subset was dictated by the requirement that the all-zeros character be reserved for the "Null/Idle" function and the all-ones character as the "Delete/Idle" function. Since the first and last columns contain these characters, the next logical choice for the graphic subset was the middle four

columns of the standard. Although this complicates the identification of this graphic subset (two bits must be examined rather than using a one bit test which would have been sufficient had these graphics been placed in the first four or last four columns), this disadvantage is outweighed by the advantages of the dense graphic subset.

A4.4 The character set was structured to enable the easy identification of classes of graphics and controls.

A5. Choice of Graphics

A5.1 Included in the set are the digits, a single case of the alphabetic letters A through Z, and those punctuation, mathematical and business characters considered most useful. The set includes the characters commonly encountered in programming languages. In particular, the COBOL graphics are included. It is not practicable to include all of the ALGOL graphics (which number around 120).

A6. Graphic Subset Structure

A6.1 The basic structure of the dense graphic subset was influenced by logical collating considerations, by the requirements of simply related 6-bit sets, and by the needs of typewriter-like devices. For information processing, it is desirable that the characters be arranged in such a way as to minimize both the operating time and the hardware components required for ordering and sequencing operations. This requires that the relative order of characters, within classes, be such that a simple comparison of the binary codes will result in information being ordered in a desired sequence.

A6.2 Conventional usage requires that the word separator (blank) be ahead of any other character in a collatable set. This permits a name such as "Johns" to collate ahead of a name such as "Johnson." The requirement that punctuation characters also collate ahead of the alphabet ("Johns, A" should also collate before "Johnson") established the special character locations, including blank, in the first column of the graphic subset.

A6.3 To simplify the design of typewriter-like devices, it is desirable that there be only a common one-bit difference between characters normally paired on keytops. This, together with the requirement for a contiguous alphabet, the collating requirements outlined above, and international considerations, resulted in the placement of the alphabet in the last two columns of the graphic subset. This left the second column of the graphic subset for the digits.

A6.4 Although the resultant structure of "specials" (S) "digits" (D) and "alphabetics" (A) does not conform to the most prevalent collating convention (SAD), it must be recognized that simple binary rules for collation do not necessarily apply between classes of characters.

A6.5 The need for a simple transformation from the set sequence to the prevalent collating convention was recognized, and dictated the placement of some of the "specials" within the set. Specifically, those special characters, viz., ampersand (&), asterisk (*), comma (,), hyphen (-), period (.) and slant (/), which are most often used as identifiers for ordering information and which normally collate ahead of both the alphabet and the digits, were *not* placed in the column containing the digits, so that the entire numeric column could be rotated via relatively simple computer logic to a position higher than the alphabet. The sequence of the aforementioned "specials" was also established to the extent practical to conform to the prevalent collating convention.

A6.6 The need to adapt a useful 4-bit numeric set from the 6-bit graphic subset also played a role in the placement of characters. Such a 4-bit set, including the digits, asterisk (*), plus (+), comma (,), hyphen (-), period (.) and slant (/), can easily be derived from the standard.

A6.7 To further international standardization, and provide the 4-bit set mentioned in A6.6, the structure of the graphic subset precludes (logically) the historic keyboard association of colon (:) with semicolon (;). However, the dual character key assignment of the question mark (?) with slant (/) was maintained, as it was with a majority of the digits and commonly paired characters.

A6.8 Considerations of other domestic code sets, including the Department of Defense Standard 8-bit data transmission code (1961) as well as international requirements, played an important role in the deliberations which resulted in the standard. The selection and grouping of the dollar sign ($), percent sign (%), ampersand (&) and apostrophe (') and the characters less than (<), equal (=), and greater than (>) permits contraction to either a business ($ % & ') or scientific (< = > ') 6-bit subset. The sequence of these latter symbols and of the characters comma (,), hyphen (-), period (.) and slant (/) permitted an advantageous pairing on a keyboard. The historic pairing of question mark (?) and slant (/) is preserved and the less than (<) and greater than (>) symbols (which are of comparatively low usage) are paired with period (.) and comma (,) so that in dual-case keyboard devices, where it is desired to have period (.) and comma (,) in both cases, the less than (<) and greater than (>) characters are the ones displaced. Provision was made for the accommodation of alphabets containing more than 26 letters and for 6-bit contraction by the location of low-usage characters in the area following the alphabet. In addition, the requirement for the "digits" 10 and 11 used in Sterling monetary areas was considered in the placement of the asterisk (*), plus (+), semicolon (;), and colon (:).

A7. Choice of Controls

A7.1 The control characters included in the set are those required for the control of terminal devices, input and output devices, format, or transmission and switching on a general enough basis to justify inclusion in a standard set.

A7.2 A group of eight codes has been reserved for information separators which when implemented in a system shall bear a hierarchical relationship. They identify boundaries of various elements of information.

A7.3 Information separators are machine-oriented controls having two characteristics which differentiate them from human-oriented separators (word separator, punctuation etc.). First, machine-oriented separators are hierarchical in nature, whereas human-oriented separators have no fixed hierarchy. Second, machine-oriented separators must serve rigidly defined functions in a system, whereas proper interpretation of human-oriented separators requires knowledge of the context in which they are used.

A8. Control Subset Structure

A8.1 The first two columns were chosen for most of the assigned controls because there are more codes in the last two columns with a high probability of being inadvertently generated during an idle line condition than there are in the first two columns. "Acknowledge" was placed where its code could be generated by simple means. "Escape" was placed so as to conform with the "Special" function of the DOD standard 8-bit code and to facilitate the 6-bit contraction.

A8.2 The controls which were selected, logically fall into four groups:

(1) Transmission controls
(2) Format effectors
(3) Device controls
(4) Information separators

Within each group the controls are ordered so that the binary and hierarchical order are directly related. This structure facilitates the contraction of the standard to related 6-bit sets and permits logical comparisons of related controls in the ordering of information. In particular, the placement of the format effectors and information separators facilitates their dual usage when contracting to a related 6-bit set.

APPENDIX B

Related Subsets and Adaptations

B1. Introduction

B1.1 The standard code was developed to provide for information interchange among information processing systems, communication systems and associated equipment. Its structure facilitates conversion from the standard code to adaptations usable internally in a variety of equipments. In a system consisting of several equipments, each with its local or native code, maximum flexibility will be achieved if each of the native codes is translated to the standard whenever information interchange is desired.

B1.2 Within any particular equipment or closed system it may be necessary to substitute characters. For example, some systems may require special graphic characters and some devices may require special control codes. Design efforts on the standard code included consideration of such adaptations and the possibility that the parties employing them may develop a need to interchange information with others. If certain simple rules are followed in making such adaptations, minimum difficulty will be encountered in conversion to the standard code.

B1.3 B2 through B5 describe possible adaptations and logically related sets.

B2. Character Substitutions

B2.1 When a nonstandard character is introduced, only the code position where the substitution is made shall be affected.

B2.2 It is recommended that graphic substitutions be made only in the graphic area and control substitutions only in the control area. Any substitution involving a control should be done only with full cognizance of all possible operational effects.

B2.3 Any such substitution will result in a nonstandard coded character set.

B3. Unassigned Codes

B3.1 A meaning was not assigned to a code unless that meaning was of sufficiently general use to warrant standardization. This resulted in some codes being unassigned. These codes are subject to future standardization. Where an unassigned code is given meaning in a particular system, such meaning is nonstandard and use of this code in information interchange is hazardous.

B4. Illustrative Nonstandard Codes

B4.1 European alphabets: the five graphics immediately following the letter Z can be replaced by the additional letters required for complete expression of certain European alphabets. Further, the single position preceding the letter A can be used for those alphabets requiring 32 characters. In most cases, however, only three additional letters will be required.

B4.2 Base 12 numeric digits: For those applications requiring use of the Sterling monetary system or duodecimal arithmetic, the "digits" 10 and 11 can replace the two graphics immediately following the digit 9.

B4.3 Code sets obtained by modifying the standard as shown above or by other replacements are nonstandard.

B5. Related Larger and Smaller Sets

B5.1 Consideration has been given to the relationship between the standard set and sets of other sizes. A number of straightforward logical transforms are possible which result in a variety of sets related to the standard. None of the transformed sets should be considered as being standard.

APPENDIX C

Specific Criteria

C1. Introduction

C1.1 This appendix contains the criteria on which the design of the code was based. Not all criteria have been entirely satisfied. Some are conflicting, and the characteristics of the set represent acceptable compromises of these divergent criteria.

C1.2 The standard has been designated a code for information interchange and not necessarily for internal use in information processing equipment. However, many of the criteria used in establishing the set are processor-oriented, since simplicity in deriving logical and consistent processing sets was considered mandatory.

C2. Criteria

C2.1 All codes in the set are to consist of the same number of binary positions (bits).

C2.2 The standard set is to be so structured as to facilitate derivation of larger or smaller sets.

C2.3 Each character code will consist of "n" binary bits. All possible 2^n combinations of 1's and 0's will be permitted and considered valid.

C2.4 The number of bits "n" shall be sufficient to provide for the alphabetic and numeric characters, commonly encountered punctuation marks, and other special characters, along with those controls required for interchange of information.

C2.5 The digits 0 through 9 shall be included in a 4-bit subset.

C2.6 The digits 0 through 9 shall be coded so that the 4 low-order bits shall be the binary-coded-decimal form of the particular digit which the code represents. In the selection of the two characters immediately succeeding the digit 9 consideration shall be given to their replacement by the graphics 10 and 11 to facilitate the adoption of the code in the Sterling monetary area.

C2.7 The interspersion of control codes among the graphic codes shall be avoided. The codes devoted to controls shall be easily separable from those devoted to graphics.

C2.8 Within the standard set, each character and its corresponding code shall stand by itself and not depend on surrounding characters for interpretation. The "mode shift" characters (SO, SI, or Escape) in an information stream shall signal a departure from the standard set.

C2.9 The alphabet A through Z shall be included in a 5-bit subset. Consideration shall be given to the need for as many as 32 characters in some alphabets.

C2.10 With the letters of the alphabet in their conventional order, A through Z, the codes shall be assigned in continuous increasing binary order. This criterion prevents interspersion of non-alphabetic characters within the alphabet.

C2.11 Suitable control codes required for communication and information processing shall be included.

C2.12 Escape functions shall be incorporated which provide for departures from the standard set.

C2.13 A simple binary comparison shall be sufficient to determine the order within each class of characters. (For the purpose of this standard, the special graphics, the digits, and the alphabet, are each defined as distinct classes.) Simple binary rules do not necessarily apply between classes when ordering information.

C2.14 The "word separator" (i.e., the blank, or the space between words) must collate ahead of all other graphics.

C2.15 Special characters used in the ordering of information must collate ahead of both the alphabet and the digits.

C2.16 Insofar as possible the special characters shall be grouped according to their functions; for example, punctuation, mathematical symbols, and shorthand abbreviations. Further, the set shall be so organized that the simplest possible test shall be adequate to distinguish and identify the basic alphabet, numeric and special character subsets.

C2.17 Special characters shall be placed in the set so as to simplify their generation by typewriters and similar keyboard devices. This criterion effectively means that the codes for pairs of characters which normally appear on the same keytops on a keyboard device shall differ only in a common single-bit position.

C2.18 The set shall contain the graphic characters of the principal programming languages.

C2.19 The codes for all control characters shall contain a common, easily recognizable, bit pattern.

C2.20 The null, idle, and delete control functions shall be provided.

APPENDIX D

Preliminary Proposed Definitions of Control Characters

D1. Communications Controls

SOM: Start of Message
The first character of message. *Message* is not limited to text, but may include header or preamble information as appropriate.

EOA: End of Address
The character which immediately follows the last address of a message. It generally indicates that the "Text" follows:

EOM: End of Message
The last* character of a message.
*In systems employing error control characters, the check character(s) covering the last "block" may follow EOM.

EOT: End of Transmission
The last character of a transmission.

WRU: Who Are You
A request for the distant end to identify itself.

RU: Are You
A command for the distant end to indicate if it is the station whose identification immediately follows the RU character.

BELL:
The character BELL is intended to be used when there is a need for *human attention* and may be used to produce any form of sensory signal.

DC_1, DC_2, DC_3, DC_4: Device Control
The characters DC_1, DC_2, DC_3, DC_4 shall have the preferred meaning as follows:
DC_1 TURN (Remote) Transmitter On
DC_2 TURN Receiver On
DC_3 TURN (Remote) Transmitter Off
DC_4 TURN Receiver Off
Other uses of these characters shall be considered nonstandard and should be undertaken with an awareness of the risks involved.

ERR: Error
A character reserved for use in error control systems. Its specific application has not yet been determined.

SYNC: Synchronization
A character which may be transmitted by a synchronous transmission system in the absence of any other character to be transmitted, as for example in the idle condition. It provides a signal from which synchronism may be retained under these circumstances.

D2. Format Effectors

Format effectors are control characters which are used to achieve a desired physical arrangement of graphic characters on two-dimensional printed copy by means of (1) horizontal positioning to a predetermined location and (2) vertical positioning to a different line. FE_0 is a format effector for which no specific assignment has yet been made.

HT/SK: Horizontal Tab
Indicates to printing devices that the subsequent graphic character is to be printed at the next one of a number of predetermined positions to the right. When sent to a card punching device, it is used to indicate that the card being punched is to be advanced to the next one of a number of predetermined positions to the right. In these instances the HT character is called Skip (SK).

V_{TAB}. Vertical Tab
On a typewriter-like device, V_{TAB} causes the relative motion of the printing point down to the next one of a number of subsequent predetermined positions. Vertical Tab would usually cause a move of more than one line, since Line Feed would be used for *one* line.

FF: Form Feed
For a typewriter-like device, using forms, FF advances the form paper so that the old form, whether completed or not, is moved out and a new blank form is moved into the proper position for printing the first line on it.

CR: Carriage Return
When received by a character-at-a-time printer, CR moves the printing point to the left-hand beginning of a printed line.

LEM: Logical End of Medium
Used in connection with the representation of the ASC II code in recording media as the last character of a logically complete sequence when the end of the sequence and the physical end of the medium do not coincide.

D3. Information Separators

Eight information separators (S_0 to S_7) are prescribed in ASC II. Five of these are defined to be hierarchical in nature (S_3 to S_7); two of these are defined as bracketing separators (S_0 and S_1); and one separator (S_2) remains undefined at this juncture.

On the Questions of a German COBOL Version

To the Editors, Communications of the ACM:

We should be very obliged if you would publish the following notice. In our minds there is an interest in this matter on the part of American experts. To avoid any misunderstanding, it is requested that the notice appear as submitted, without any alteration or deletion.

Fachnormenausschuss Informationsverarbeitung
The Secretary
(signed) MOHR

The Technical Committee for Information Processing (FNI) in the German Institute of Standardization (DNA), 1000 Berlin 15, Uhlandstrasse 175 (Germany) is concerned with the standardization of programming languages in its Subcommittee 5. In dealing with the programming language COBOL the question arose whether the similarity of COBOL to a natural language, viz. English, aimed at in the original version, requires the preparation of a German COBOL version. After due consideration by Subcommittee 5, the FNI recommends that COBOL in the English version be used for the present as programming language and as the basis for compilers to be prepared.

FNI hopes that this recommendation will further the international standardization in the field of programming languages and will facilitate the exercise of influence on and the rapid adaptation to future developments of COBOL.

In addition to other technical advantages such as freer choice of identifiers, an important advantage for those using and preparing compilers is that different syntactical structures of COBOL dependent on the natural language used are avoided.

FNI is not unaware of the disadvantages involved in this recommendation, such as a certain increase in difficulty for the inexperienced German reader of COBOL programs, but feels that it can be asserted that the conceptional difficulties are in any case greater than those involved by notation.

FNI will, of course, give a description in German of a programming language intended to be standardized. Subcommittee 5 is at present engaged in finding German equivalents for the necessary technical terms of COBOL.